should not consider independently risks posed by individual substances in gasoline. For example, before the Administrator can prohibit the sale or use of a fuel or fuel additive under § 211(c) of the Act, he must first determine

> that in his judgment such prohibition will not cause the use of any other fuel or fuel additive which will produce emissions which will endanger the public health and welfare to the same or greater degree than the use of the fuel or fuel additive proposed to be prohibited.[162/]

This language clearly contemplates that EPA will compare the risks associated with new fuels with those associated with existing fuels before taking action to prohibit the use of new fuels or fuel additives.[163/]

That Congress intended for the Agency to undertake comparative risk assessment when considering the regulation of fuels and fuel additives is also reflected in other statutory

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[162/] 42 U.S.C. § 7545(c)(2)(C)(emphasis added).

[163/] This emphasis on comparative risk is not surprising as a policy matter. As explained by one commentator:

> Modern technology . . . generally "replaces" rather than "adds to." Every regulation of one source of risk will cause some secondary "risk displacement," encouraging producers or consumers to favor alternative, less stringently regulated processes or products that will themselves be risky in some degree. A policy of rigidly screening new technology . . . [without closely scrutinizing "old" risk at the same time] locks society into the hazardous present and excludes a possibly safer future.

Huber, The Old-New Division in Risk Regulation, 69 Va. L. Rev. 1025, 1073 (1983)(emphasis added). The ultimate result of uneven scrutiny of new and existing risks may actually be to "increase public exposure to risk, an absolutely unacceptable result." Id. at 1085.

provisions. For example, the Alternative Fuels Act of 1988 requires EPA to conduct

> a comprehensive analysis of the air quality, global climate change, and other positive and negative environmental impacts, if any, including fuel displacement effects, associated with the production, storage, distribution, and use of all alternative motor vehicle fuels under the Alternative Motor Fuels Act of 1988, as compared to gasoline and diesel fuel.[164/]

Similarly, the new reformulated fuel provisions of the Clean Air Act, which require the development of more cleanly burning gasolines, are based entirely upon a comparison of aggregate emission products of the new reformulated gasolines (e.g., emissions of toxic and volatile organic compounds) with the emission products of existing conventional gasoline.[165/]

Finally, as reflected in a draft document entitled "ORD Interim Alternative Fuels Research Plan," EPA itself has clearly acknowledged the important role of comparative risk assessments for regulating fuels generally -- i.e., "alternative fuels must be assessed comparatively to conventional fuels."[166/] Only in this way can "the full range of impacts, both beneficial and

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164/ 42 U.S.C. § 6374d(b)(1)(A)(emphasis added).

165/ See id. at § 7545(k).

166/ ORD Interim Alternative Fuels Research Plan, Draft No. 1, May 9, 1990, Office of Research and Development, U.S. Environmental Protection Agency ("Alternative Fuels Research Plan") at E-1 (emphasis added); see also Alternative Fuels Research Plan at 2-1 ("The benefits and/or risks of alternative fuels must be assessed in the context of existing fuels.").

adverse, . . . be quantified so that risk-benefit analyses can be performed."[167/]

With this background in mind, ORD in its November 1990 report on health and environmental impacts acknowledges that use of the Additive would have various beneficial impacts.[168/] Since ORD completed its preliminary analysis, Clement has analyzed more completely the public health benefits associated with use of the Additive, in order to present a comparative assessment of the type described above.

Clement's analysis quantifies the reductions in cancer risk and other health endpoints associated with reduced emissions of NOx, CO, benzene and other air toxics.[169/] This analysis shows that use of the Additive would substantially reduce cancer risks, both on a nationwide basis (a projected reduction in annual cancer cases of 48) and on an individual basis (particularly for the most highly exposed individuals).[170/] Exposures to levels of NOx and CO would also be reduced significantly, especially in microenvironments.[171/]

[167/] Id.

[168/] See ORD Risk Assessment, at 1-2.

[169/] The analysis was based on, among other information, the fleet emission data, and speciation data conducted by SWRI on a pair of fleet test vehicles using fuels of equal octane. See Appendix 13, Attachment 6, at 12-13.

[170/] Id. at 29-31.

[171/] Id. at 30. It should also be noted that the ambient impact of any small change in particulate emissions would be insignificant. Id. at 23-24. Indeed, under the Prevention of Significant Deterioration ("PSD") program, EPA has identified ambient concentrations of various pollutants that it views as

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As noted by Clement:

> The key aspect of the net risk analysis . . . is that, for whatever highly exposed population group considered, exposures to

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171/ (...continued)
"insignificant" -- i.e., that are so small that they would not contribute to ambient air quality standard exceedances. See 43 Fed. Reg. 26388, 26398 (1978) ("These levels . . . are . . . interpreted by the Administrator as representing the minimum amount of ambient impact that is significant."). For particulate matter, the concentrations are 5 ug/m^3 for 24 hours, and 1 ug/m^3 on an annual basis. 40 C.F.R. § 51.165(b) (1991).

SAI predicted the urban ambient air quality impact of the particulate emissions shown in the recent SWRI testing based on two different ambient air quality models. One set of predictions relied on the South Coast Risk and Exposure Analysis Model ("SCREAM"). See Appendix 16, at 1-3. A second set of predictions relies on the ratio of measured vehicular particulate emissions to CO emissions, and ambient CO concentrations for New York City from EPA's Aerometric Information Retrieval System. Id. at 3-4.

These modeling analyses show that predicted ambient impacts are only a small fraction of the regulatory significance levels established by EPA. On a 24 hour basis, the predicted ambient impacts for the two models are only 9 and 13 percent of the relevant significance level, respectively. On an annual basis, the predicted ambient impacts are only 22 and 25 percent of the annual significance level. Since ambient impacts below EPA's significance levels do not, by definition, contribute to exceedances of the ambient standard for particulate, the very slight increase in particulate emissions associated with use of the Additive cannot be a basis for denying Ethyl's waiver application.

Finally, as EPA has recognized, "Congress has implicitly judged the economic, environmental, and cost-benefit implications of the new [particulate matter] standards [that apply to light duty vehicles starting in 1994] to be acceptable." 56 Fed. Reg. at 25737. This means that incremental ambient impacts associated with particulate matter emissions up to the full standard amount (0.080 gpm) have been deemed by Congress to be "acceptable." Since EPA has also recognized that it does not have discretion to second guess Congress with respect to these standards, 56 Fed. Reg. at 9754. Any incremental ambient impacts below those associated with emissions of particulate matter at the level of the standard (0.080 gpm) are of no regulatory significance.

> manganese can be expected to scale proportionally with reductions in exposures to carcinogenic hydrocarbons and to CO and NOx. . . . From the perspective of any potential member of a high exposure group at any projected exposure level, the potential benefits from MMT [the Additive] use increase in proportion to exposure to auto emissions.[172/]

In other words, the population identified by ORD as the most highly exposed to manganese, and therefore subject to the highest potential risks, is the same population which could benefit most from the reductions in NOx, CO, benzene and other toxic emissions associated with use of the Additive.

Based on this analysis, Clement concludes that:

> This analysis indicates that a car run on unleaded gasoline with MMT [the Additive] has a less harmful mix of emissions than does a comparable car run on unleaded gasoline of equivalent octane. Whether one compares these two cases based on annual emissions in the U.S. or on the basis of potential exposures in high-concentration micro-environments, the analysis of net risk indicates that MMT [the Additive] use in unleaded gasoline would result in a net public health benefit.[173/]

In light of the other significant environmental and energy benefits associated with use of the Additive,[174/] the results of this comparative risk analysis clearly establish that use of the Additive would be consistent with the overall goals of the Act.

[172/] Appendix 13, at 22-23.

[173/] Id., Attachment 6, at 31 (emphasis added).

[174/] See Appendix 1, at 60-70.

IV. OTHER ISSUES SUPPORTING APPROVAL OF THE WAIVER APPLICATION

A. Use of the Additive Will Not Cause or Contribute to the Failure of Heavy-Duty Vehicles to Meet Applicable Emission Standards.

At the request of EPA's Office of Mobile Sources, Ethyl initiated tests to determine whether heavy duty engines operated on fuel containing the Additive would exhibit changes in emissions similar to those for Ethyl's 48 car test fleet.[175/]

[175/] While Ethyl has complied with the Agency's request to submit data for heavy duty engines using fuel containing the Additive, Ethyl does not believe that the Act requires submission of these data. The only change Congress made to section 211(f) as a part of the Clean Air Act Amendments of 1990 was the addition of new subsection 211(f)(1)(B). As explained by the legislative history, Congress did not intend this new subsection to change or to displace the requirements of subsection 211(f)(1)(A) as it applies to the use of new fuel additives in unleaded gasoline. Rather, Congress merely intended

> to clarify that the requirement to obtain waivers for new fuels and fuel additives not substantially similar to the fuels used in vehicle certification applies not only to unleaded gasoline, but to all other fuels and fuel additives, including leaded gasoline, diesel fuel, and consumer additives.

See House Report No. 101-490, 101st Cong., 2d Sess. (May 17, 1990) at 313 (emphasis added).

This description of the meaning of § 211(f)(1)(B) is consistent with the legislative history of § 211(f)(1)(A). The Senate Committee on Environment and Public Works made clear in 1977 that the original provision was intended only to "prevent the use of any new . . . additive in . . . unleaded grades of gasoline . . ., but not . . . [to] limit the use of such additives in the leaded grades of gasoline." S. Rep. No. 127, 95th Cong., 1st Sess. (1977). Congress therefore perceived a need to extend the scope of the waiver application requirement to cover fuels other than unleaded grades of gasoline.

Moreover, on May 30, 1991, EPA issued an advance notice of proposed rulemaking which confirms this reading of § 211(f)(1)(B). In this notice, the Agency proposed to define

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To this end, Ethyl retained ECS and SWRI to test two pairs of engines from the most commonly used heavy duty engine models. The two heavy duty engine families selected were the 5.7 liter V-8 engine manufactured by General Motors ("GM") and the 5.8 liter V-8 engine manufactured by Ford Motor Company.[176/]

[175/] (...continued)
the term "substantially similar" as used in § 211(f)(1)(B) with regard to diesel fuel and fuel additives. 58 Fed. Reg. 24362 (1991). As justification for its action, EPA explained that the new subsection "expands the prohibitions of section 211(f)(1) to include diesel fuel and fuel additives." Id. (Emphasis added). At the same time, the Agency acknowledged that § 211(f)(1)(A) is the provision which applies to the use of unleaded fuels and fuel additives in light duty motor vehicles. Id.

Section 211(f)(1)(B) therefore merely extends the scope of the fuels and fuel additives subject to the waiver requirement, not the nature of the testing which must be conducted to obtain a waiver for use of additives in unleaded fuel. Since Ethyl does not seek permission to use the Additive in "leaded gasoline, diesel fuel, and consumer additives" or the vehicles which use those fuels, Ethyl need only comply with the subsection governing waiver applications for use of fuel additives in unleaded gasoline -- namely, § 211(f)(1)(A). Section 211(f)(1)(A) only requires testing of new unleaded fuel additives in light duty motor vehicles. Indeed, any other interpretation of § 211(f)(1)(B) would make § 211(f)(1)(A) superfluous, a result clearly not intended by Congress, nor favored by the courts. See, e.g., Mountain States Tel & Tel Co. v. Pueblo of Santa Ana, 472 U.S. 237, 239 (1985)(An elementary cannon of construction is that statutes should be interpreted so as not to render one part inoperative.).

It also merits noting that in connection with the new reformulated fuel program, EPA has proposed rules for certifying potential reformulated fuels which do not require testing of heavy duty engines. As explained by the Agency, "due to the predominance of light-duty vehicles and light-duty trucks in the gasoline vehicle market and the added testing burden associated with heavy duty engine/vehicle testing, EPA is proposing that heavy duty vehicles need not be included in the [reformulated fuel] test fleet." 56 Fed. Reg. 31176, 31196 (July 9, 1991).

[176/] See Appendix 17, at 1.

Using the standard durability dynamometer test facilities at ECS, one engine from each pair was operated for purposes of mileage accumulation on Howell EEE base fuel and the other operated on Howell EEE plus the Additive. ECS measured emissions for each engine at the start of the test (i.e., after the standard break-in period), and then after accumulation of engine operation in accordance with the standard certification procedures for heavy duty engines. Emission measurements were conducted using the 18 mode rating cycle as described in 40 C.F.R. § 86.335-79 to 86.346-79. Moreover, the cycle used to accumulate engine hours was similar to that used by manufacturers in engine/catalyst durability testing.

Following completion of 250 hours of operation, the vehicles were then transported to SWRI for constant volume sampler ("CVS") heavy duty engine test cell emission measurements.[177/] As additional engine hours were accumulated, additional emission measurements were obtained.

The results of this testing are consistent with the results obtained from the 48 car test fleet -- i.e., use of the Additive does not adversely affect regulated pollutant emissions.[178/] Under normal operating conditions, emissions for both sets of vehicles remained below the applicable standard limitations, and the emission deterioration for the two pairs of engines was

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[177/] Id. at 1-2.

[178/] Id. at 6.

comparable regardless of the fuel type.[179] Indeed, after 250 hours of operation for the Ford engine and 375 hours for the GM engine, all gaseous emissions resulting from use of the Additive were below those resulting from use of clear fuel. Moreover, based on the emission data from this test program and published deterioration factors for these engines, the test engines would have been certified as complying with the applicable emission limitations even if operated on fuel containing the Additive.[180]

Finally, Ethyl has also conducted two test programs involving severe, high speed testing on vehicles equipped with large V-8 engines.[181] In one of the test programs, two Chevrolet Corvettes were operated for 25,000 miles at a constant speed of 100 mph.[182] In the second test program, a pair of Ford Crown Victorias were operated 35,000 miles at high speeds (60 to 80 mph) for about 50 percent of the mileage accumulation.[183]

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[179] Id., Tables 2 and 6. EPA has indicated that the certification of heavy-duty engines depends ultimately on "good engineering practice" since "[t]he operation of durability engines for specified period of time is not required." Federal Certification Test Results for 1991 Model Year, U.S. Environmental Protection Agency at 8.

[180] Id. at 4.

[181] See II-D-3, Appendix 3 ("Durability Testing, Materials Compatibility Testing, Evaporative Emissions, Driveability, and Particulate Emissions"); Appendix 8 ("High Speed Corvette Durability Test").

[182] See supra pp. 35-36.

[183] See supra p. 33.

The results of these test programs showed that, even under severe operating conditions, use of the Additive would not adversely affect emission control system operation or durability. The high temperatures experienced during these high speed tests are reflective of heavy duty engine operating conditions, and therefore further demonstrate that use of the Additive in heavy duty vehicles will not cause or contribute to the failure to meet applicable emission standards.

In summary, this testing shows that the emission characteristics of heavy duty engines operating on unleaded fuel containing the Additive should be no different than the emission characteristics reflected in the 48 car test fleet data, data which clearly show that use of the Additive meets the § 211(f)(4) waiver criteria.

B. Approval of the Waiver Application Would Enhance the Ability of the Refining Industry to Meet the New Reformulated Fuel Requirements.

As reported earlier to EPA, SWRI conducted speciation tests on two of Ethyl's test fleet vehicles using several different fuel combinations. The vehicles tested were two Ford Crown Victorias, each of which had accumulated about 65,000 miles, one using fuel containing the Additive and one using clear fuel. The results of this speciation testing indicate that the Additive could assist in meeting the new reformulated gasoline requirements of the Act.

For purposes of the speciation testing, SWRI added a small amount of xylenes to each of the test fuels in order to equalize

the fuel octane. The fuels tested included a regular "commercial" gasoline, a reformulated gasoline and Howell EEE certification gasoline. The results of this testing show that use of the Additive reduced the total reactivity of the hydrocarbon emissions from the vehicles using fuel containing the Additive, and also reduced, both in the aggregate and individually, "toxic" emissions as defined by the Clean Air Act Amendments.

The table below summarizes the speciation test results[184]:

Percentage Reduction with HiTEC 3000

Fuel	NMHC[185]	Reactivity[186]	Toxics[187]
Howell EEE	14%	30%	27%
Texaco	18%	24%	13%
EC-1	2%	23%	13%
Howell EEE "neat"[188]	14%[189]	28%	28%

Based on these test results, the Additive could be very helpful in meeting the reductions in ozone-forming volatile organic

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184/ See Appendix 18.

185/ "NMHC" refers to non-methane hydrocarbons.

186/ Reactivity is a measure of the ozone forming potential of HC tailpipe emissions. It is the product of the HC emission measurements generated under the FTP and "reactivity" factors developed by Dr. William Carter (University of California, Riverside). Dr. Carter's factors have been used by the California Air Resources Board.

187/ Data shown are aggregate emissions of four toxics: benzene, formaldehyde, 1,3-butadiene, and acetaldehyde.

188/ This test used Howell EEE with and without the Additive, and no added xylenes.

189/ Total hydrocarbons as opposed to non-methane hydrocarbons.

compounds ("VOCs") and toxic air pollutants required by the new reformulated gasoline provisions of the Act.[190/]

The speciation results also suggest that the Additive could prove helpful in meeting the toxic emission reduction requirements of the reformulated fuel provisions. Beginning in 1995, reformulated gasoline must achieve toxic emission reductions of 15 percent.[191/] The speciation test results show that the Additive, by itself, has the potential to achieve much, if not all, of this required reduction.

C. Use of the Additive Has A Substantial Energy Benefit.

As noted in prior submissions to the Agency, use of the Additive will allow refineries to operate under less severe conditions. As a direct consequence, the Additive could result in a maximum reduction in crude oil imports of up to about 30 million barrels per year, a savings in crude oil nearly equal to the amount of oil stored annually in the U.S. Strategic Petroleum Reserve.[192/]

V. CONCLUSION

The information submitted by Ethyl in this waiver application clearly demonstrates that Ethyl has met its burden under § 211(f)(4) of the Act -- i.e., that use of the Additive

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190/ See 42 U.S.C. § 211(k). At a minimum, the Act requires a reduction in ozone-forming VOC emissions of 15 percent beginning in 1995.

191/ Id. at § 211(k)(3)(B).

192/ Docket No. II-D-4, Appendix 6, at 5-6 ("Additional Environmental, Economic and Energy Benefits Associated with Use of the HiTEC 3000 Additive").

will not cause or contribute to the failure of emission control devices to meet applicable emission standards. Ethyl has further shown that use of the Additive in unleaded gasoline will not entail risks to either public health or the environment. Indeed, use of the Additive will reduce, in the aggregate, the risks associated with the combustion of gasoline in motor vehicles, and will produce other energy and economic benefits. For these reasons, the Agency should act promptly to approve Ethyl's waiver application.

BEFORE THE
UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

IN RE APPLICATION FOR A FUEL ADDITIVE WAIVER FILED BY ETHYL CORPORATION UNDER § 211(f)(4) OF THE CLEAN AIR ACT

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July 12, 1991

ATTACHMENT 1

The following documents contained in EPA Docket No. A-90-16 are explicitly incorporated by reference in this proceeding. Copies of these documents are currently located in EPA Docket No. A-90-16, and Ethyl requests that these documents be placed in the new docket established for this proceeding. To the extent that EPA needs additional copies of any of these documents, Ethyl will be happy to provide them.

Docket Number	Item	Document Number
II-D-1	Fuel Waiver Application for Ethyl HiTEC 3000	May 9, 1990
II-D-2	Appendices to Ethyl Waiver Application -- Volume One	May 9, 1990
II-D-3	Appendices to Ethyl Waiver Application -- Volume Two	May 9, 1990
II-D-4	Appendices to Ethyl Waiver Application -- Volume Three	May 9, 1990
IV-D-58	Ethyl Corporation, Jeffrey G. Smith; Letter with attachments ("Comments in Support of the Waiver Application for the HiTEC® 3000 Performance Additive," accompanied by 11 Appendices)	July 23, 1990
IV-D-82	Ethyl Corporation, Jeffrey G. Smith, with attachments	August 10, 1990

Docket Number	Item	Document Number
	("Reply Comments of Ethyl Corporation in Support of the HiTEC® 3000 Waiver Application," accompanied by 5 Appendices)	
IV-D-139	Ethyl Corporation (Supplement), Jeffrey G. Smith ("Supplemental Reply of Ethyl Corporation to Late-Filed Comments on Public Health Effects of HiTEC-3000," accompanied by 4 Attachments)	August 23, 1990
IV-D-155	Ethyl Corporation, Jeffrey G. Smith	August 30, 1990
IV-D-191	Hunton & Williams, J. Adams, et al.; Letter with attachments addressed to Mary T. Smith	October 19, 1990
IV-D-194	Hunton & Williams, J. Adams, et al.; Letter with attachment addressed to Mary T. Smith	October 25, 1990
IV-D-197	Hunton & Williams, J. Adams, et al.; Letter with attachments addressed to Mary T. Smith	October 30, 1990